CLAIMS

What is claimed is:

1. An optical band pass interferometer, comprising:

(a) a first flat substrate having a very low absorption loss including a first and a second surface; said first surface having a highly reflective coefficient of $\mathbf{r_1}$, and a transmission coefficient of $\mathbf{t_1}$ to enable output of light beams;

(b) a second flat substrate having a very low absorption loss including a first surface and a second surface; said first surface having a highly reflective coefficient of $\mathbf{r_2}$ wherein $\mathbf{r_2}$ is greater than $\mathbf{r_1}$; said second flat substrate being mounted parallel to said first flat substrate with respective first surfaces facing each other;

(c) a wave guide for guiding an input light beam to reflect off of said second surface at a near normal incidence angle;

(d) an optical medium having a predetermined refractive index located between said first and second surfaces; and;

(e) an optical converging element spaced from said second surface of said first flat substrate for converging said output light beams incident thereon into a focused spot.

2. An optical band pass interferometer as in claim 1 wherein said near normal incidence angle is approximately 1 degree.

3. An optical band pass interferometer as in claim 1 wherein said input light beam is a collimated light beam.

4. An optical band pass interferometer as in claim 1 further comprising an adjustable spacer positioned between said first and second surfaces for parallel mounting of said flat substrates and for adjusting the spacing between said first and second surfaces;

5. An optical band pass interferometer as in claim 1 further comprising a refractive index adjuster for adjusting the refractive index of said optical medium;

6. An optical band pass interferometer as in claim 4 further comprising a first voltage source connected to said adjustable spacer for electrically adjusting the spacing between said first and second surfaces.

7. An optical band pass interferometer as in claim 5 further comprising a second voltage source connected to said refractive index adjuster for electrically adjusting the refractive index of said optical medium.

8. An optical band pass interferometer as in claim 6 wherein said adjustable spacer is a piezo-electric control voltage device.

9. An optical band pass interferometer as in claim 7 wherein said refractive index adjuster is an electro-optical control voltage device.

10. An optical band pass interferometer as in claim 1 further comprising:

a displacement transducer for measuring the changes in the spacing between said first and second surfaces; said displacement transducer to generate a input signal for a controller; and

a controller for monitoring the tunable operation of said interferometer using said input signal generated by said displacement transducer.

11. An optical band pass interferometer as in claim 1 wherein said optical converging element is chosen from the group consisting of a spherical lens system, an aspherical lens system, a gradient-index (GRIN) lens system, any combination of the foregoing systems, and any other optical converging system constructed to collect and converge said output light beams.

12. An optical band pass interferometer as in claim 1 wherein said focused spot is an input aperture of an output optical fiber.

13. A tunable optical band pass interferometer, comprising:

(a) a first flat substrate having a very low absorption loss including a first and a second surface; said first surface having a highly reflective coefficient of r_1, and a transmission coefficient of t_1 to enable output of light beams;

(b) a second flat substrate having a very low absorption loss including a first surface and a second surface; said first surface having a highly reflective coefficient of r_2 wherein r_2 is greater than r_1; said second flat substrate being mounted parallel to said first flat substrate with respective first surfaces facing each other;

(c) a wave guide for guiding an input light beam to reflect off of said second surface at a near normal incidence angle;

(d) an optical medium having a predetermined refractive index located between said first and second surfaces;

(e) an optical converging element spaced from said second surface of said first flat substrate for converging said output light beams incident thereon into a focused spot;

(f) an adjustable spacer positioned between said first and second surfaces for parallel mounting of said flat substrates and for adjusting the spacing between said first and second surfaces;

(g) a refractive index adjuster for adjusting the refractive index of said optical medium; an optical converging element spaced from said second surface of said second flat substrate for converging said output light beams incident thereon into a focused spot;

(h) a displacement transducer for measuring the changes in the spacing between said first and second surfaces; said displacement transducer to generate a input signal to be used by a controller; and;

(i) a controller for monitoring the tunable operation of said interferometer using said input signal generated by said displacement transducer.

14. An optical band pass interferometer as in claim 13 wherein said near normal incidence angle is approximately 1 degree.

15. An optical band pass interferometer as in claim 13 wherein said input light beam is a collimated light beam.

16. An optical band pass interferometer as in claim 13 further comprising a first voltage source connected to said adjustable spacer for electrically adjusting the spacing between said first and second surfaces.

17. An optical band pass interferometer as in claim 13 further comprising a second voltage source connected to said refractive index adjuster for electrically adjusting the refractive index of said optical medium.

18. An optical band pass interferometer as in claim 16 wherein said adjustable spacer is a piezo-electric control voltage device.

19. An optical band pass interferometer as in claim 17 wherein said refractive index adjuster is an electro-optical control voltage device.

20. An optical band pass interferometer as in claim 13 wherein said optical converging element is chosen from the group consisting of a spherical lens system, an aspherical lens system, a gradient-index (GRIN) lens system, any combination of the foregoing systems, and any other optical converging system constructed to collect and converge said output light beams.

21. An optical band pass interferometer, comprising:

(a) a first flat substrate having a very low absorption loss including a first and a second surface; said first surface having a highly reflective coefficient of $\mathbf{r_1}$, and a transmission coefficient of $\mathbf{t_1}$ to enable output of light beams;

(b) a second flat substrate having a very low absorption loss including a first surface and a second surface; said first surface having a highly reflective coefficient of $\mathbf{r_2}$ wherein $\mathbf{r_2}$ is greater than $\mathbf{r_1}$; said second flat substrate being mounted parallel to said first flat substrate with respective first surfaces facing each other and said spacing between said respective first surfaces being comparable with one wavelength of light;

(c) a wave guide guiding an input light beam to reflect off said second surface at a near normal incidence angle;

(d) an optical medium having a predetermined refractive index located between said first and second surfaces; and;

(e) an optical converging element spaced from said second surface of said first flat substrate for converging said output light beams incident thereon into a focused spot.

22. An optical band pass interferometer as in claim 21 wherein said near normal incidence angle is approximately 1 degree.

23. An optical band pass interferometer as in claim 21 wherein said input light beam is a collimated light beam.

24. An optical band pass interferometer as in claim 21 further comprising an adjustable spacer positioned between said first and second surfaces for parallel mounting of said flat substrates and for adjusting the spacing between said first and second surfaces.

25. An optical band pass interferometer as in claim 21 further comprising a refractive index adjuster for adjusting the refractive index of said optical medium.

26. An optical band pass interferometer as in claim 24 further comprising a first voltage source connected to said adjustable spacer for electrically adjusting the spacing between said first and second surfaces.

27. An optical band pass interferometer as in claim 26 further comprising a second voltage source connected to said refractive index adjuster for electrically adjusting the refractive index of said optical medium.

28. An optical band pass interferometer as in claim 26 wherein said adjustable spacer is a piezo-electric control voltage device.

29. An optical band pass interferometer as in claim 27 wherein said refractive index adjuster is an electro-optical control voltage device.

30. An optical band pass interferometer as in claim 21 further comprising

a displacement transducer for measuring the changes in the spacing between said first and second surfaces; said displacement transducer to generate a input signal for a controller; and

a controller for monitoring the tunable operation of said interferometer using said input signal generated by said displacement transducer.

31. An optical band pass interferometer as in claim 21 wherein said optical converging element is chosen from the group consisting of a spherical lens system, an aspherical lens system, a gradient-index (GRIN) lens system, any combination of the foregoing systems, and any other optical converging system constructed to collect and converge said output light beams.

32. An optical band pass interferometer as in claim 21 wherein said focused spot is an input aperture of an output optical fiber.

33. A tunable optical band pass interferometer, comprising:

(a) a first flat substrate having a very low absorption-loss including a first and a second surface; said first surface having a highly reflective coefficient of $\mathbf{r_1}$, and a transmission coefficient of $\mathbf{t_1}$ to enable output of light beams;

(b) a second flat substrate having a very low absorption loss including a first surface and a second surface; said first surface having a highly reflective coefficient of $\mathbf{r_2}$ wherein $\mathbf{r_2}$ is greater than $\mathbf{r_1}$; said second flat substrate being mounted parallel to said first flat substrate with respective first surfaces facing each other and said spacing between said respective first surfaces being less than one wavelength of light;

(c) a wave guide for guiding an input light beam to reflect off of said second surface at a near normal incidence angle;

(d) an optical medium having a predetermined refractive index located between said first and second surfaces;

(e) an optical converging element spaced from said second surface of said first flat substrate for converging said output light beams incident thereon into a focused spot;

(f) an adjustable spacer positioned between said first and second surfaces for parallel mounting of said flat substrates and for adjusting the spacing between said first and second surfaces;

(g) a refractive index adjuster for adjusting the refractive index of said optical medium; an optical converging element spaced from said second surface of said first flat substrate for converging said output light beams incident thereon into a focused spot;

(h) a displacement transducer for measuring the changes in the spacing between said first and second surfaces; said displacement transducer to generate a input signal for a controller; and

(i) a controller for monitoring the tunable operation of said interferometer using said input signal generated by said displacement transducer.

34. An optical band pass interferometer as in claim 33 wherein said near normal incidence angle is approximately 1 degree.

35. An optical band pass interferometer as in claim 33 wherein said input light beam is a collimated light beam.

36. An optical band pass interferometer as in claim 33 further comprising a first voltage source connected to said adjustable spacer for electrically adjusting the spacing between said first and second surfaces.

37. An optical band pass interferometer as in claim 33 further comprising a second voltage source connected to said refractive index adjuster for electrically adjusting the refractive index of said optical medium.

38. An optical band pass interferometer as in claim 36 wherein said adjustable spacer is a piezo-electric control voltage device.

39. An optical band pass interferometer as in claim 37 wherein said refractive index adjuster is an electro-optical control voltage device.

40. An optical band pass interferometer as in claim 33 wherein said optical converging element is chosen from the group consisting of a spherical lens system, an aspherical lens system, a gradient-index (GRIN) lens system, any combination of the foregoing systems, and any other optical converging system constructed to collect and converge said output light beams.

41. An optical band pass interferometer as in claim 33 wherein said focused spot is an input aperture of an output optical fiber.